



CITY OF TAMPA

Bob Buckhorn, Mayor

CONTRACT ADMINISTRATION DEPARTMENT

Michael W. Chucran, Director

ADDENDUM 2

DATE: December 15, 2017

Contract 17-C-00047; David L. Tippin Water Treatment Facility Research Lab Renovation

Bidders on the above referenced project are hereby notified that the following addendum is made to the Contract Documents. BIDS TO BE SUBMITTED SHALL CONFORM TO THIS NOTICE.

Item 1: The Bid Date for the above referenced project is hereby changed to January 9, 2018.

Item 2: Specifications - Insert the attached Sections:

Section 02 1000	Selective Demolition and Cutting and Patching
Section 02 3610	Termite Control
Section 03 3000	Cast-in-Place Concrete
Section 06 1000	Rough Carpentry
Section 07 2100	Building Insulation
Section 07 8410	Through-Penetration Firestop System
Section 07 9005	Joint Sealers
Section 09 2116	Gypsum Board Assemblies
Section 09 6500	Resilient Flooring – Chemical Resistant
Section 09 9120	Painting
Section 11 6100	Laboratory Fume Hoods Uniflow SE Airestream Series
Section 12 3553	Wood Laboratory Casework

All other provisions of the Contract Documents and Specifications not in conflict with this Addendum shall remain in full force and effect. Questions are to be e-mailed to ContractAdministration@tampagov.net.

Jim Greiner

Jim Greiner, P.E., Contract Management Supervisor

SECTION 02 1000 - SELECTIVE DEMOLITION AND CUTTING AND PATCHING**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Selective Demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Cutting and patching.
- D. Cleaning and protection.

1.2 SUBMITTALS

- A. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of City of Tampa or separate Contractor.

1.3 QUALIFICATIONS

- A. For demolition work, employ a firm specializing in the type of work required.
 - 1. Minimum of 5 years of documented experience.

1.4 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- D. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- E. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

PART 2 PRODUCTS**2.1 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 SELECTIVE DEMOLITION

- A. Recycle materials whenever possible, including ceiling tiles, carpet, drywall, and metal studs. In addition to demolished materials, all general construction debris must be included in the recycling program.
- B. Definitions:
 - 1. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
 - 2. Remove and Salvage: Detach items from existing construction and deliver them to Owner.
 - 3. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
 - 4. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- C. Material Ownership:
 - 1. Owner has the right to any/all equipment, fixtures or materials that are being removed. Coordinate with Owner at pre-construction conference for list of salvaged items to Owner.
 - 2. Items of salvable value only to Contractor may be removed from area as work progresses. Salvaged items must be transported from site as they are removed.
 - 3. Storage or sale of removed items on site will not be permitted.
- D. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as shown.
 - 2. Report discrepancies to Owner and Wilder Architecture, Inc. before disturbing existing installation.
- E. Submittals:
 - 1. Permits and notices authorizing demolition.
 - 2. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
 - 3. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.
 - 4. Predemolition Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.
 - 5. Beginning of alterations work constitutes acceptance of existing conditions.
- F. Quality Assurance:
 - 1. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
 - 2. Professional Engineer Qualifications: Comply with Division 1 Section "Quality Requirements."
 - 3. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
 - 4. Standards: Comply with ANSI A10.6 and NFPA 241.
 - 5. Predemolition Conference: Conduct conference at Project site to comply with requirements in Section 013000.
 - 6. Observations: Design Team, Contractor, and Owner shall observe areas slated for demolition prior to commencement of demolition (after utilities are disconnected) and after demolition is complete.
- G. Project Conditions:
 - 1. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
 - 2. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - a. Do not close or obstruct corridors, elevators or passageways within the existing building without prior written request and permission no less than 72 hours in advance from Owner. Provide alternate routes around closed corridors, elevators or passageways.
 - 3. Owner assumes no responsibility for condition of areas to be selectively demolished.
 - a. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 4. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 5. Storage or sale of removed items or materials on-site will not be permitted.
 - 6. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - a. Maintain fire-protection facilities in service during selective demolition operations.
 - 7. Areas to be demolished will be vacated and discontinued in use before start of work.
- H. Warranty:

1. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.
- I. Examination:
1. Cap and identify exposed utilities and coordinate with Owner.
 2. Verify that utilities have been disconnected and capped.
 3. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
 4. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
 5. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Owner and Architect.
 6. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- J. Utility Services:
1. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.
 2. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
 - a. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.
 - b. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
 - c. Arrange to shut off indicated utilities with utility companies.
 - d. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
 - e. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
 3. Capping services after demolition will be the responsibility of the Contractor within areas of demolition. Capping of services will be determined at floor level, above the ceiling to its highest available height or behind wall. Notify the affected utility company in advance and obtain approval before starting work. Coordinate with Owner.
 4. Place marker to indicate location of disconnected services. Identify service lines and capping locations on Project Record Drawings.
 5. Refer to electrical demolition drawing for scope of electrical demolition work. Removal of the lamps and ballast to be disposed of as required by code. Proof of disposal must be given to Owner in the close out documents and before final payment and supply temporary lighting and power.
 6. Refer to mechanical, and fire protection drawings for scope of demolition work. Cap existing ductwork that is still in use back to the partition at the perimeter of the contract area. There shall be no inconvenience to the Owner during any downtime. Coordinate shutdowns with a prior 72 hour notice.
- K. Preparation:
1. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
 2. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - a. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - b. Maintain approved means of egress from existing building exits as required by code. When closing off egress routes, install Owner approved temporary signage.
 - c. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - d. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - e. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - f. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
 - g. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

3. Erect and maintain 1 hour rated partitions as required to prevent spread of dust, fumes and smoke to other parts of the building. On completion, remove partitions and repair damaged surfaces to match adjacent surfaces. Partitions shall be minimum of 1-hour rated construction when separating work area from occupied areas, or where required by Code or governing authorities.
 4. Provide 1 hour rated assembly temporary partitions to allow continued building occupancy by Owner during construction making sure Owner's area remains dust free. (See Infectious Control Risk Worksheet) Coordinate all activities generating excess noise with Tampa General Hospital prior to commencement of work.
 5. Where doorways or other egress or access is required through dust partitions, provide labeled door assemblies with positive latching and automatic closures to maintain rating of partition. Exit paths shall be maintained clear of equipment, material, and debris and shall be marked with approved exit signs illuminated at all times.
 6. Coordinate installation and removal of temporary partitions with the Owner to facilitate Owner's use of building.
 7. Carry out demolition work to cause as little inconvenience to adjacent occupied building areas as possible.
- L. Pollution Controls:
1. Dust Control: Use temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
 - a. Do not use water mist.
 - b. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
 - c. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 1) Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - d. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.
- M. Execution:
1. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - a. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - b. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - c. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - d. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - e. Maintain adequate ventilation when using cutting torches.
 - f. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - g. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - h. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - i. Cease operations and notify Owner immediately, if safety of structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.
 - j. Dispose of demolished items and materials promptly.
 - k. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
 - l. Existing Facilities: Comply with Owner's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.
 - m. Removed and Salvaged Items. Comply with the following:

- 1) Carefully remove, store and protect the following materials and equipment for salvage to the Owner:
 - (a) Lighting fixtures
 - (b) Electric door switches
 - (c) Door, frames and hardware
- 2) Clean salvaged items.
- 3) Store items in a secure area until delivery to Owner.
- 4) Protect items from damage during transport and storage.
- n. Removed and Reinstalled Items: Comply with the following:
 - 1) Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 - 2) Protect items from damage during transport and storage.
 - 3) Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- o. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.
- p. Immediately repair all demolition performed more than required, at no cost to the Owner.
- q. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- r. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- s. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- t. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.
 - 1) Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.
- u. Roofing: Remove no more existing roofing than can be covered in one day by new roofing. Refer to applicable Division 7 Section for new roofing requirements.
- v. Removal all electrical conduits wire fittings and components not presently in use. Wiring and conduit to be removed up to electrical panels to level with floor or deck above.
- w. Prevent damage, movement or settlement of structure while doing renovation work. Provide and place temporary bracing or shoring and be responsible for safety and support of structure. Assume liability for such movement, settlement, damage and injury.
- x. Remove demolished materials, debris, tools and equipment from site upon completion of work. Leave site in a condition acceptable to the Owner.
- N. Patching and Repairs:
 1. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
 2. Patching: Comply with provisions in "Cutting and Patching."
- O. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
- P. Provide, erect, and maintain temporary dustproof partitions of construction.
- Q. Remove existing work as indicated and as required to accomplish new work.
 1. Remove items indicated on drawings.
 2. Relocate items indicated on drawings.
 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- R. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, Telecommunications, and: Remove, relocate, and extend existing systems to accommodate new construction.
 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. Provide temporary connections as required to maintain existing systems in service.
 4. Verify that abandoned services serve only abandoned facilities.

5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- S. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
- T. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Wilder Architecture, Inc..
 2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
 3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Wilder Architecture, Inc. review and request instructions.
- U. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- V. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- W. Clean existing systems and equipment.
- X. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- Y. Do not begin new construction in alterations areas before demolition is complete.
- Z. Comply with all other applicable requirements of this section.
- AA. Salvaged Items

3.4 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Selective Demolition article above for additional requirements.
- C. Submittals:
1. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - a. Identification of project
 - b. Extent: Describe cutting and patching, the location and description of affected work, show how they will be performed, and indicate why they cannot be avoided. List any alternates to cutting and patching.
 - c. Effect on work of the Owner or separate contractor.
 - d. Written permission of affected separate contractor.
 - e. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - f. Products: List products to be used and firms or entities that will perform the Work.
 - g. Dates: Indicate when cutting and patching will be performed.
 - h. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 - i. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - j. Owner and Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.
- D. Quality Assurance:
1. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
 - a. Foundation construction.
 - b. Bearing and retaining walls.
 - c. Structural concrete.
 - d. Structural steel.

- e. Lintels.
 - f. Structural decking.
 - g. Miscellaneous structural metals.
 - h. Equipment supports.
 - i. Piping, ductwork, vessels, and equipment.
2. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - a. Primary operational systems and equipment.
 - b. Air or smoke barriers.
 - c. Fire-protection systems.
 - d. Control systems.
 - e. Communication systems.
 - f. Conveying systems.
 - g. Electrical wiring systems.
 3. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Equipment supports.
 - d. Piping, ductwork, vessels, and equipment.
 - e. Noise- and vibration-control elements and systems.
 4. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 - a. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.
 - 1) Roofing.
- E. Materials:
1. General: Comply with requirements specified in other Sections of these Specifications and materials required for the original installation.
- F. Examination:
1. Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
 2. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 3. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
 4. Beginning of cutting or patching means acceptance of existing conditions.
- G. Preparation:
1. Temporary Support: Provide temporary support of Work to be cut.
 2. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
 3. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
 4. Maintain excavations free of water.
- H. Performance:
1. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - a. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
 - b. Employ original installer to perform cutting and patching for weather exposed and moisture resistant elements, and sight exposed surfaces.
 2. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

- a. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - b. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
 - c. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - d. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - e. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - f. Proceed with patching after construction operations requiring cutting are complete.
 - g. Remove and replace defective or non conforming work.
 - h. Remove samples of installed work for testing when requested.
3. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
- a. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - b. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - c. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - 1) Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - d. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
 - e. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
 - f. Mechanical and Electrical Penetrations:
 - 1) Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
 - 2) At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated fire resistant material, in accordance with Section 07 8400, to full thickness of the penetrated element.
 - g. Remove and replace defective or non conforming work.
 - h. Remove samples of installed work for testing when requested.
- I. Perform whatever cutting and patching is necessary to:
- 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-conforming work.
- J. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- K. Restore work with new products in accordance with requirements of Contract Documents.
- L. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- M. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- N. Patching:
- 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.5 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.
- E. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- F. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
 - 1. Install and maintain temporary barriers between construction project area and existing structure along with issue of policy and procedures to ensure safety, air quality, noise control, and protection of existing facilities.
- G. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.
- G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

END OF SECTION

SECTION 02 3610 - TERMITE CONTROL**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following for termite control:
 - 1. Soil treatment.

1.3 DEFINITIONS

- A. EPA: Environmental Protection Agency.
- B. PCO: Pest control operator.

1.4 SUBMITTALS

- A. Product Data: Treatments and application instructions, including EPA-Registered Label.
- B. Product Certificates: Signed by manufacturers of termite control products certifying that treatments furnished comply with requirements.
- C. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Formulate and apply termiticides, and label with a Federal registration number, to comply with EPA regulations and authorities having jurisdiction.
- B. Applicator of termite treatment shall contract directly with the GC or CM, not with a subcontractor.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with EPA-Registered Label requirements and requirements of authorities having jurisdiction.
- B. Prior to each application, applicators must notify the construction superintendent of similar responsible party of the intended termiticide application and sites of application and instruct the responsible person to notify workers and other individuals on site to leave the area to be treated during application until the termiticide is absorbed into the soil

1.7 COORDINATION

- A. Coordinate soil treatment application with excavating, filling, and grading and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs, before construction.

1.8 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, signed by applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
- C. Identification: the Warranty shall identify the chemical used and the building number(s) to which it was applied.
- D. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT

- A. Termiticide: Provide one of the following non-repellant chemicals:
 - 1. Imidacloprid (such as Premise 75), diluted to the strongest allowable concentration according to the manufacturer's written instructions.
 - 2. Fipronil (such as Termidor 80 WG), diluted to the strongest allowable concentration according to the manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of the soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control. Proceed with application only after unsatisfactory conditions have been corrected.
 - 1. Do not treat soil that is too moist or if there is standing water.
- B. Product is to be delivered to the site in its original labeled containers.

3.2 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparing substrate. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended by termiticide manufacturer.
- C. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.
- D. Prior to each application, applicator shall notify the Contractor of the intended termiticide application and intended sites of application and instruct the Contractor to notify workers and other individuals on site to leave the area to be treated during application and until the termiticide is absorbed into the soil.
- E. Subcontractor shall mix the chemical on site from original, unopened, labeled containers. Construction Manager is responsible for enforcing this requirement and verifying dilution rates.
- F. Notify the School Board Inspections Department 48 hours prior to applying the chemical. Owner will observe application.

3.3 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.
- B. Scope: Protect against subterranean termites for all new construction and whenever the soil under existing construction is disturbed.

3.4 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute the treatment evenly.
 - 1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
 - 2. Foundations: Adjacent soil including soil along entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footers, piers, and chimney bases; and along entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
 - a. When treating foundations deeper than 4 feet, apply the termiticide as the backfill is being replaced, or failing this, treat the foundation to a minimum depth of 4 feet after the backfill has been installed by trenching and rodding into the trench or trench along the foundation walls and around pillars and other foundation elements at the rate prescribed from grade to a minimum depth of 4 feet.
 - b. When the top of the footing is exposed, treat the soil adjacent to the footing to the bottom of the footing. Do not treat below the footings.
 - 3. Masonry: Treat CMU cells in stem walls to the top of the footing. Apply at the strongest allowable concentration and rate according to manufacturer's instructions. Apply so that the emulsion will reach the top of the footing.
 - 4. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Horizontal Barriers: Create a horizontal barrier whenever treated soil will be covered, such as footing trenches, slabs, and the soil beneath stairs, crawlspaces and sidewalks adjacent to the building.
 - 1. Apply at the strongest allowable concentration and rate according to manufacturer's instructions. If the fill is washed gravel or other coarse material, apply a sufficient amount of dilution to reach the soil substrate beneath the coarse fill.

2. Applications shall be made per manufacturer's instructions. If slab will not be placed the same day as treatment, cover treated soil with a waterproof barrier such as polyethylene sheeting. If the slab is not placed within 24 hours of treatment, re-treat the area.
- C. Vertical Barriers: Create vertical barriers around the base of foundations, plumbing, utility entrances, back-filled soil against foundation walls and other critical areas.
1. Apply 4 gallons of dilution per 10 linear feet per foot of depth to ensure complete coverage.
 2. When trenching and rodding into the trench, or trenching, ensure that the emulsion reaches the top of the footing. Space rod holes to achieve a continuous termiticidel barrier, but in no case more than 12 inches apart.
 3. Avoid soil washouts around the footings.
 4. Trenches need not be wider than 6 inches. Emulsion shall be mixed with the soil as it is being replaced in the trench.
 5. For a monolithic slab, an inside vertical barrier may not be required.
- D. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- E. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- F. Post warning signs in areas of application.
- G. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application or if not covered within 24 hours.
- H. Do not apply soil treatment if the ground conditions in the area to be treated are too moist or if standing water is present.

END OF SECTION

SECTION 03 3000 - CAST-IN-PLACE CONCRETE**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Action Submittal:
 - 1. Design Mixtures: For each concrete mixture.

1.4 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Comply with the following sections of ACI 301, unless modified by requirements in the Contract Documents:
 - 1. "General Requirements."
 - 2. "Formwork and Formwork Accessories."
 - 3. "Reinforcement and Reinforcement Supports."
 - 4. "Concrete Mixtures."
 - 5. "Handling, Placing, and Constructing."
- C. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

PART 2 - PRODUCTS

2.1 FORMWORK

- A. Furnish formwork and formwork accessories according to ACI 301.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.
- D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I/II. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class C or F.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregate: ASTM C 33, graded, 1-1/2-inch nominal maximum aggregate size.
- C. Lightweight Aggregate: ASTM C 330, 1-inch nominal maximum aggregate size.
- D. Water: ASTM C 94/C 94M.
- E. Synthetic Fiber: Monofilament or fibrillated polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches long.

2.4 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.6 CONCRETE MIXTURES

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:
 - 1. Minimum Compressive Strength: See General Notes on drawings.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.50.
 - 3. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
 - 4. Slump Limit: See General Notes on drawings.
 - 5. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of trowel-finished floor slabs to exceed 3 percent.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116, and furnish batch ticket information.
 - 1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
 - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

- A. Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.
 - 1. Lap joints 6 inches and seal with manufacturer's recommended adhesive or joint tape.
- B. Underslab Vapor Retarder: Stegowrap 15 mil or equal. Install per manufacturer's recommendations and requirements as they relate to specific project conditions.

3.4 STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Locate and install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Comply with ACI 301 for placing concrete.
- B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- C. Consolidate concrete with mechanical vibrating equipment.
- D. Equipment Bases and Foundations:
 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 2. Construct concrete bases as specified on the drawings; and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
 3. Minimum Compressive Strength: 3500 psi at 28 days.
 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete substrate.
 6. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 7. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.7 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
 1. Do not further disturb surfaces before starting finishing operations.
 2. Retain one or more of five paragraphs below for types of slab finishes required. Coordinate slab finishes with a finish schedule or indicate location of each on Drawings.
- C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes, unless otherwise indicated.
- D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.
- E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
- F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- G. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.8 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:
 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.

- b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests: Perform according to ACI 301.
 1. Testing Frequency: One composite sample shall be obtained for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.

3.10 REPAIRS

- A. Remove and replace concrete that does not comply with requirements in this Section.

END OF SECTION

SECTION 06 1000 - ROUGH CARPENTRY**PART 1 GENERAL**

- 1.1 SECTION INCLUDES
 - A. Preservative treated wood materials.
 - B. Concealed wood blocking, nailers, and supports.
- 1.2 REFERENCE STANDARDS
 - A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - B. AWPA U1 - Use Category System: User Specification for Treated Wood.
 - C. PS 20 - American Softwood Lumber Standard.
 - D. SPIB (GR) - Grading Rules.
- 1.3 SUBMITTALS
 - A. See Section 01 3300 - Submittal Procedures.
 - B. Product Data: Provide technical data on application instructions and lumber provided.
 - C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
- 1.4 DELIVERY, STORAGE, AND HANDLING
 - A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

- 2.1 GENERAL REQUIREMENTS
 - A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
 - 2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
 - B. Lumber fabricated from old growth timber is not permitted.
 - C. Provide wood harvested in the state of Florida.
 - D. Provide sustainably harvested wood.
- 2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS
 - A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
 - B. Sizes: Nominal sizes as indicated on drawings, S4S.
 - C. Moisture Content: S-dry or MC19.
 - D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.
- 2.3 ACCESSORIES
 - A. Fasteners and Anchors:
 - 1. Metal and Finish: Stainless steel for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 - 2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
 - 3. Anchors: Toggle bolt type for anchorage to hollow masonry.
- 2.4 FACTORY WOOD TREATMENT
 - A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
 - 2. The chemical treatment used shall not promote corrosion when in contact with aluminum, carbon steel, steel roof decking, and cold-formed metal faming including when the galvanized coating is nicked and/or penetrated by fasteners.
 - B. Preservative Treatment:

1. Manufacturers:
 - a. Arch Wood Protection, Inc; SillBor: www.wolmanizedwood.com.
 - b. Viance, LLC; TimberSaver 40: www.treatedwood.com.
 - c. Osmose, Inc: www.osmose.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - a. Treat lumber exposed to weather.
 2. Treat lumber in contact with roofing, flashing, or waterproofing.
 3. Treat lumber in contact with masonry or concrete.
 4. Treat lumber less than 18 inches above grade.

PART 3 EXECUTION

3.1 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Provide the following specific non-structural framing and blocking:
 1. Cabinets and shelf supports.
 2. Wall brackets.
 3. Wall-mounted door stops.

3.4 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.5 CLEANING

- A. Waste Disposal: Comply with the requirements of Section 01 7419 - Construction Waste Management and Disposal.
 1. Comply with applicable regulations.
 2. Do not burn scrap on project site.
 3. Do not burn scraps that have been pressure treated.
 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 07 2100 - BUILDING INSULATION**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Concealed building insulation.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of insulation product specified.
- C. Product test reports from and based on tests performed by a qualified independent testing agency evidencing compliance of insulation products with specified requirements including those for thermal resistance, fire-test-response characteristics, water-vapor transmission, water absorption, and other properties, based on comprehensive testing of current products.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated on Drawings or specified elsewhere in this Section as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
 - 1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths with mold resistance properties.
- B. Insulation Board: Owens Corning Foamular 250 (or equal): 3" thick rigid closed cell insulation.

2.2 AUXILIARY INSULATING MATERIALS

- A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or that interfere with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, unsoiled, and has not been exposed at any time to ice and snow.

- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Apply single layer of insulation to produce thickness indicated.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between closed-cell (non-breathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
 - 1. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
- D. Apply self-supported, spray-applied, cellulosic insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make it even with studs by using method recommended by insulation manufacturer.
- E. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..

3.5 INSTALLATION OF SAFING INSULATION

- A. Install safing insulation to fill gap between edge of concrete floor slab and back of exterior spandrel panels on safing clips spaced as needed to support insulation, but not further apart than 24 inches o.c. Cut safing insulation wider than gap to be filled to ensure compression fit and seal joint between insulation and edge of slab with calking approved by safing insulation manufacturer for this purpose. Leave no voids in completed installation.

3.6 PROTECTION

- A. General: Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 07 8410 - THROUGH-PENETRATION FIRESTOP SYSTEMS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
 - 1. Walls and partitions.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
- B. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

PART 2 - PRODUCTS

2.1 FIRESTOPPING, GENERAL

- A. **Compatibility:** Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. **Accessories:** Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - a. Substrate primers.
 - b. Collars.
 - c. Steel sleeves.

2.2 FILL MATERIALS

- A. **General:** Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. **Latex Sealants:** Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- C. **Firestop Devices:** Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. **Intumescent Composite Sheets:** Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- E. **Intumescent Putties:** Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- F. **Intumescent Wrap Strips:** Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. **Silicone Foams:** Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- H. **Silicone Sealants:** Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. **Grade:** Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

2.3 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. **Surface Cleaning:** Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.
- 3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION
- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- 3.4 CLEANING AND PROTECTION
- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.
- 3.5 THROUGH-PENETRATION FIRE AND SMOKE STOP SYSTEM SCHEDULE
- A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Firestop Systems with No Penetrating Items: Comply with the following:
1. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
- C. Firestop Systems for Metallic Pipes, Conduit, or Tubing: Comply with the following:
1. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
- D. Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing FS: Comply with the following:
1. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Intumescent wrap strips.
 - e. Firestop device.
- E. Firestop Systems for Electrical Cables: Comply with the following:
1. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.

- d. Silicone foam.
- F. Firestop Systems for Insulated Pipes: Comply with the following:
 - 1. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
 - c. Silicone foam.
 - d. Intumescent wrap strips.
- G. Firestop Systems for Miscellaneous Electrical Penetrants: Comply with the following:
 - 1. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
- H. Firestop Systems for Miscellaneous Mechanical Penetrations: Comply with the following:
 - 1. Type of Fill Materials: One or both of the following:
 - a. Latex sealant.
- I. Firestop Systems for Groupings of Penetrations: Comply with the following:
 - 1. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent wrap strips.
 - c. Firestop device.
 - d. Intumescent composite sheet.

END OF SECTION

SECTION 07 9005 - JOINT SEALERS**PART 1 GENERAL**

- 1.1 SECTION INCLUDES
 - A. Sealants and joint backing.
- 1.2 RELATED REQUIREMENTS
 - A. Section 07 8400 - Firestopping: Firestopping sealants.
- 1.3 REFERENCE STANDARDS
 - A. ASTM C834 - Standard Specification for Latex Sealants.
 - B. ASTM C1193 - Standard Guide for Use of Joint Sealants.
 - C. CAL (VOC) - Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers (including Addendum 2004-01); State of California Department of Health Services.
- 1.4 ADMINISTRATIVE REQUIREMENTS
 - A. Coordinate the work with other sections referencing this section.
- 1.5 SUBMITTALS
 - A. See Section 01 3300 - Submittal Procedures.
 - B. Product Data: Provide data indicating sealant chemical characteristics and VOC Content.
 - C. Samples: Submit two samples, illustrating sealant colors for selection.
 - D. VOC Data: Submit VOC content documentation for all non-preformed sealants and primers. Certify each product submitted meets the VOC limits of the project per section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
 - 1. Where products specified exceed VOC limits, provide a VOC compliant product that performs in the same manner and conditions as that specified.
 - E. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.
- 1.6 QUALITY ASSURANCE
 - A. Maintain one copy of each referenced document covering installation requirements on site.
 - B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- 1.7 FIELD CONDITIONS
 - A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- 1.8 COORDINATION
 - A. Coordinate the work with all sections referencing this section.
- 1.9 WARRANTY
 - A. Correct defective work within a twenty year period after Date of Substantial Completion.
 - 1. Provide a twenty (20) year material warranty.
 - 2. Provide a five (5) year warranty for installer's warranty.
 - B. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

- 2.1 MANUFACTURERS
 - A. Silicone Sealants:
 - 1. Tremco; Product - Spectrem series products: www.tremcosealants.com
 - B. Acrylic Emulsion Latex Sealants:
 - 1. Tremco; Product Tremflex Siliconized Acrylic Latex Sealant: www.tremcosealants.com
- 2.2 SEALANTS
 - A. Sealants and Primers - General: Provide products having volatile organic compound (VOC) content as specified in Section 01 6116.
 - B. Type IN-1 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
 - 1. Color: To be selected by Wilder Architecture, Inc. from manufacturer's standard range.

2. Product: Tremflex Siliconized Acrylic Latex Sealant manufactured by Tremco, Inc..
3. Applications: Use for:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces, interior locations.
 - c. At soffit 'T' molding and wall surfaces.
 - d. Other interior joints for which no other type of sealant is indicated.

2.3 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.
- C. Field Adhesion Testing: Manufacturer shall visit the site to perform random field adhesion "pull tests".
 1. Perform 10 adhesions tests for the initial 1,000 LF of sealant installed.
 2. Sealant contractor shall perform random pull tests as well of similar quantity.
 3. Record results of pull tests.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Tool joints concave.

3.4 CLEANING

- A. Clean adjacent soiled surfaces.

3.5 PROTECTION

- A. Protect sealants until cured.

END OF SECTION

SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Fire rated area separation walls.
- D. Gypsum wallboard.
- E. Joint treatment and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 09 9120 - Painting.

1.3 REFERENCE STANDARDS

- A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute. (replaced SG-971)
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
- E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
- G. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
- H. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- I. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base.
- J. ASTM C1396/C1396M - Standard Specification for Gypsum Board.
- K. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- L. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
- M. GA-216 - Application and Finishing of Gypsum Board.

1.4 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing.
- C. Product Data: Provide data on metal framing, gypsum board, accessories, joint finishing system, and manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- D. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.5 QUALITY ASSURANCE

- A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.
- B. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 10 years of experience.

PART 2 PRODUCTS**2.1 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Fire Rated Assemblies: Provide appropriate materials to comply with and repair existing 1-hour rated partition.

2.2 METAL FRAMING MATERIALS

- A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
 - 1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the

effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.

2. Studs: "C" shaped with flat or formed webs with knurled faces.
3. Runners: U shaped, sized to match studs.

2.3 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:

1. Georgia-Pacific Gypsum: www.gpgypsum.com.
2. National Gypsum Company: www.nationalgypsum.com.
3. USG Corporation: www.usg.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Use for vertical surfaces, unless otherwise indicated.
2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
3. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
4. Edges: Tapered.

2.4 ACCESSORIES

A. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.

1. Types: As detailed or required for finished appearance.

B. Beads, Joint Accessories, and Other Trim: ASTM C1047, _____, unless noted otherwise.

C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
3. Chemical hardening type compound.
4. Coordinate joint materials with the requirements of the specified Air Barrier Manufacturer.

D. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.

G. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.2 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Studs: Space studs at 16 inches on center.

1. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

C. Openings: Reinforce openings for weight of doors or operable panels, using not less than double studs at jambs.

D. Blocking: Install wood blocking for support of:

1. Wall mounted cabinets.
2. Wall mounted door hardware.

E. Blocking: Install blocking for support of hardware. Bolt or screw steel channels to studs.

3.3 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

- C. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.
- D. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.

3.4 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.5 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, bedded and finished with chemical hardening type joint compound.
 - 1. Coordinate joint materials with the requirements of the specified Air Barrier Manufacturer.
- B. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 3. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
 - 2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
 - 3. Taping, filling and sanding is not required at base layer of double layer applications.

3.6 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 6500 - RESILIENT FLOORING (CHEMICAL RESISTANT)**PART 1 - GENERAL**

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Resilient tile flooring for commercial traffic.
 2. Resilient wall base.
 3. Substrate preparation.
- B. Related Work: The following items are not included in this Section and are specified under the designated Sections:
1. Section 033000 - CAST-IN-PLACE CONCRETE for concrete substrate; slab surface tolerances; vapor retarder for applications on or below grade.
- C. References (Industry Standards):
1. American Association of Textile Chemists and Colorists (AATCC):
 - a. AATCC 134 Electrostatic Propensity of Carpets
 2. American National Standards Institute (ANSI):
 - a. ANSI ESD S97.2: Floor Materials and Footwear - Voltage Measurement on a Person
 3. ASTM International (ASTM):
 - a. ASTM C518: Standard Test Method for Steady State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - b. ASTM D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
 - c. ASTM D2047: Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
 - d. ASTM D2240: Standard Test Method for Rubber Property - Durometer Hardness
 - e. ASTM D3389: Standard Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform, Double Head Abrader)
 - f. ASTM D6499: Standard Test Method for the Immunological Measurement of Antigenic Protein in Natural Rubber and its Products
 - g. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
 - h. ASTM E648: Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
 - i. ASTM E662: Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - j. ASTM E1745: Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
 - k. ASTM E2179: Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors
 - l. ASTM E2180: Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) in Polymeric or Hydrophobic Materials
 - m. ASTM F150: Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring.
 - n. ASTM F155: Method of Test for Temper of Strip and Sheet Metals for Electronic Devices
 - o. ASTM F386: Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
 - p. ASTM F710: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - q. ASTM F925: Standard Test Method for Resistance to Chemicals of Resilient Flooring
 - r. ASTM F970: Standard Test Method for Static Load Limit
 - s. ASTM F1344: Standard Specification for Rubber Floor Tile
 - t. ASTM F1482: Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
 - u. ASTM F1514: Standard Test Method for Measuring Heat Stability of Resilient Flooring by Color Change
 - v. ASTM F1515: Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change
 - w. ASTM F1861: Standard Specification for Resilient Wall Base

- x. ASTM F2055: Standard Test Method for Size and Squareness of Resilient Floor Tile by Dial Gage Method
- y. ASTM F2170: Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
- z. ASTM F2199: Standard Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat
- aa. ASTM F3010: Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings
- ab. ASTM G21: Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- ac. International Organization for Standardization (ISO):
- 4. ISO 140: Measurement of sound insulation in buildings and of building elements
 - a. National Fire Protection Association (NFPA):
- 5. NFPA 258: Test Method for Specific Density of Smoke Generated by Solid Materials

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, installation guide and maintenance guide for each material and accessory proposed for use.
- B. Samples: Submit three representative samples of each product specified for verification.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide resilient flooring manufactured by a firm with a minimum of 10 years' experience with resilient flooring of type equivalent to those specified.
 - 1. Manufacturer's quality management system must have ISO 9001:2000 approval.
 - 2. Provide resilient flooring products, including wall base, accessories and subfloor preparation products from one manufacturer to ensure color matching and compatibility.
 - 3. Manufacturer shall be capable of providing technical training and technical field service representation.
- B. Installer Qualifications: Acceptable to manufacturer of resilient flooring or INSTALL (International Standards & Training Alliance) resilient certified for the requirements of the project.
- C. Sustainable Design Requirements:
 - 1. ISO 14001 Environmental Management Systems certification.
 - 2. Construction waste take back program for the purpose of reducing jobsite waste by taking back uninstalled waste flooring. Details of the nora® program are available at www.nora.com/us.
 - 3. Flooring surfaces that are easily cleaned and do not require coatings and stripping, or use chemicals that may be hazardous to human health.
 - 4. Supply all required products that are CA 01350 compliant.
 - 5. Flooring that is free of materials known to be teratogenic, mutagenic or carcinogenic.
 - 6. Flooring that contains no polyvinyl chloride or plasticizers.
 - 7. Flooring that contains no halogens.
 - 8. Flooring that contains no asbestos.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.
- B. Deliver materials sufficiently in advance of installation to condition materials to the required temperature for 48-hours prior to installation.

1.6 PROJECT CONDITIONS

- A. Maintain temperature and humidity at service levels or the ambient temperature must remain steady ($\pm 10^{\circ}\text{F}$) and be between 59°F and 80°F for at least 48-hours prior, during and 72-hours after installation.) The ambient relative humidity is recommended to be $50\% \text{ RH} \pm 10\%$; however, dew point must be avoided.

1.7 WARRANTY

- A. Provide manufacturer's standard limited warranty for wear, defect and conductivity.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. Basis-of-Design or equal to meet the Owner's chemical resistance requirements and hardness for rolling loads: nora systems, Inc., 9 Northeastern Blvd., Salem, NH 03079; telephone 800-332-NORA or 603-894-1021; fax 603-894-6615.

2.2 RESILIENT TILE FLOORING FOR COMMERCIAL TRAFFIC

- A. Rubber Floor Tile:

1. Product Name: norament xp, Article 1880
 2. ASTM F1344 Standard Specification for Rubber Floor Tile: Type IB and Grade 1
 3. Limited Wear Warranty: 10 years
 4. Material: nora vulcanized rubber compound xp with environmentally compatible color pigments that are free of toxic heavy metals like lead, cadmium or mercury.
 5. Composition: Homogeneous
 6. Color: Manufacturer's Standard Colors
 7. Surface: Hammered
 8. Back of Tile: Double - Sanded Smooth.
 9. Material Size (ASTM F2055): 39.53 inches by 39.53 inches
 10. Squareness (ASTM F2055): +/- 0.10 inches is required (meets requirements)
 11. Thickness (ASTM 386): ~0.14 inches
 12. Dimensional Stability (ASTM F2199): = 0.15% in both directions is required
 13. Flammability (E648/NFPA 253): NBSIR 75 950, 0.71, = 0.45 watts/sq. cm for Class 1 is required
 14. Smoke Density (ASTM E662/NFPA 258): NBS, 423 (flaming) and 290 (non-flaming), < 450 is required
 15. CAN/ULC-S102.2: Surface Burning, FSC1 of 55 and SD of 450
 16. Burn Resistance: Resistant to cigarette and solder burns
 17. Slip Resistance (ASTM D2047): Static coefficient of friction, Neolite dry 0.90 Neolite wet 1.0, = 0.5 is required
 18. Bacteria Resistance (ASTM E2180/ASTM G21): Resistant to bacteria, fungi, and micro-organism activity
 19. VOC's: This flooring is GREENGUARD Gold Certified for Low VOC Emissions and CA 01350 compliant
 20. Latex Allergies (ASTM D6499): Inhibition Elisa, results are below detection level
 21. Sound Absorption (ASTM E2179): ? IIC 15 (compare only ? values)
 22. Hardness (ASTM D2240): Shore type "A", 89, = 70 is required
 23. Static Load (ASTM F970): Residual compression of 0.002 inches with 800 lbs., = 0.005 inches with 250 lbs. is required
 24. Rolling Load Limit: = 850 lbs. / sq. inch
 25. Abrasion Resistance (ASTM D3389): 1.1 lbs. (500g) load on H-18 wheel with 1000 cycles, 0.005 oz. (0.13g) weight loss, = 0.035 oz. (1.0g) is required
 26. Oil & Grease Resistance: No
 27. Heat Resistance (ASTM F1514): Easily achieved with all batches and regular maintenance, Avg. ?E = 8.0 is required
 28. Static Generation (AATCC 134): < 2000 Volts at 20% RH
 29. Cleaning: Cleaned and maintained effectively using water, nora® cleaning pads and a suitable cleaning machine, without the use of any factory and/or field-applied coatings. Also without using any chemicals that may be hazardous or containing any teratogenic, mutagenic or any other ingredients known to be carcinogenic.
 30. Shine: Higher shine achieved by buffing without any artificial topical applied coatings
 31. Stain Removal: Samples of the product must be provided for stain removal testing by the owner. Sample size should be ~1m2, pre-cleaned by manufacture per published recommendations. Samples must have no coatings, sealers, floor finish or other manually or mechanically applied finish on the surface of the product. Stain testing must consist of application of common healthcare related disinfectants and chemicals to include, but not limited to, Betadine, Methylene Blue, Silver Nitrate and alcohol based hand sanitizer. Duration of test period must be no less than one week. Removal of chemicals must be in accordance with manufacturers published cleaning and maintenance recommendations.
 32. Substrate Preparation: Per ASTM F710 and the nora® Installation Guide
- B. Flash Cove: Extend flooring up the wall using the boot flash coving method to the indicated height. Provide cove stick and suitable capping strip. All internal and external vertical seams should be noraplan cold welded with a color coordinated nora cold weld. Note: do not heat weld the vertical seams.

PART 3 - EXECUTION

3.1 GENERAL CONTRACTOR RESPONSIBILITIES

- A. Supply a safe, climate controlled building and subfloor as detailed in the nora Installation Guide (available at www.nora.com/us).
- B. A concrete subfloor that meets the requirements of ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring is required, or as detailed in the nora Installation Guide or nora® nTx Installation Guide as appropriate.
- C. Valid tests and accpetle test results should be obtained and provided to the end user and flooring contractor, including documenting with photographs, the location of all tests, recorded % relative humidity levels and temperature of both the concrete subfloor and ambient conditions prior to flooring installation. Testing

should be performed at the correct, controlled ambient service temperature and humidity following the protocol of ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes, using a Wagner Rapid RH probes only. It is recommended that moisture testing be performed by a certified International Concrete Repair Institute (ICRI) Tier 2 Testing Technician - Grade 1. Verify that the concrete slab is below the maximum allowable %RH required by the flooring manufacturer.

- D. Only if it is not possible to provide a concrete substrate with acceptable moisture levels, or that (when appropriate) have a confirmed effective vapor retarder, then a surface applied moisture mitigation system should be used that meets the requirements of ASTM F3010 Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings. Please note that all additional costs associated with this concrete condition are the responsibility of the general contractor / end user, including any additional requirements for concrete preparation, priming, leveler, patching, or labor.
 - E. A concrete subfloor that is structurally sound, and has finished shrinking, cracking, curling or moving in any way is required.
 - F. A secure storage area that is maintained permanently or temporarily at ambient service temperature and humidity (except walk in freezers or similar), or 68°F ± 5° F and 50% ± 10% relative humidity, for at least 48-hours prior to and during the application of the flooring, so the flooring contractor can acclimate the flooring materials is required.
 - G. An installation area that is weather tight and maintained either permanently or temporarily at ambient service temperature and humidity (except walk in freezers or similar), or 68°F ± 5° F and 50% ± 10% relative humidity, for at least 48-hours prior to, during and 72-hours after the application of the flooring is required.
 - H. Areas with direct prolonged exposure to sunlight should be protected with the use of Low E glass doors and windows or facades.
 - I. Areas of the flooring that are subject to direct sunlight through doors or windows should have them covered using blinds, curtains, cardboard or similar for the time of the installation and 72-hours after the installation to allow the adhesive to cure. Note: These areas should be installed using wet adhesives only.
 - J. Prevent all traffic for a minimum of 12-hours and rolling loads for 72-hours to allow the adhesive to cure. If required, after 12-hours protect the flooring from damage during construction operations using Masonite, plywood or a similar product, ensuring first that the flooring surface is free of all debris. Lay panels so that the edges form a butt joint and tape the joint to prevent both movement and debris entrapment underneath them. Inspect immediately before covering and after removal for final acceptance.
 - K. Cold weld all seams of the flooring system.
 - L. Have the flooring cleaned no sooner than 72-hours (unless given written permission from the nora® Technical Department) after the installation using either the nora pro clean® system or a standard method as detailed in the appropriate nora® Maintenance Guide.
- 3.2 FLOORING CONTRACTOR RESPONSIBILITIES
- A. Provide trained installers that have at least one of the following:
 - 1. Approved by nora systems, Inc. for all of the requirements of the project or INSTALL (International Standards & Training Alliance) certified for the requirements of the project.
 - 2. An effective installation manager, to manage the project, installers, and ensure that all of the required procedures are followed as detailed in the nora Installation Guide (available at www.nora.com/us).
 - B. Follow all requirements in the appropriate nora Installation Guide or nora nTx Installation Guide.

END OF SECTION

SECTION 09 9120 - PAINTING**PART 1 - GENERAL**

1.1 SUMMARY

- A. This Section includes surface preparation and field painting of exposed interior items and surfaces.
 - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color or finish is not indicated, Architect will select from standard colors and finishes available.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include the following factory-finished components:
 - a. Architectural woodwork.
 - b. Acoustical Wall Panels.
 - c. Metal lockers.
 - d. Elevator entrance doors and frames.
 - e. Elevator equipment.
 - f. Finished mechanical and electrical equipment.
 - g. Light fixtures.
 - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Furred areas.
 - b. Ceiling plenums.
 - c. Pipe spaces.
 - d. Duct shafts.
 - e. Elevator shafts.
 - f. Attic spaces.
 - 3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - 4. Operating parts include moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
 - 5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.2 REFERENCED STANDARDS

- A. The referenced standards listed below are considered part of the requirements listed in this section. If specific aspects of the standards do not apply, the Contractor shall identify the specific references in writing prior to beginning work. All requests for omission must be approved by the Architect.
 - 1. ASTM International (ASTM)
 - a. ASTM A 123 Hot-Dip Galvanized Coatings on Iron and Steel Products;
 - b. ASTM A 780 - Repair of Hot Dip Galvanized Coatings;
 - c. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications;
 - d. ASTM D 653 Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process;
 - e. ASTM D 6386 - Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting;
 - f. ASTM D 2092 Preparation of Zinc-Coated (Galvanized) Steel Surfaces for Painting;
 - g. ASTM D 4258 Surface Cleaning Concrete for Coating;
 - h. ASTM D 4261 Surface Cleaning Concrete Unit Masonry for Coating;
 - i. ASTM D 4259 Abrading Concrete;
 - j. ASTM F 1869 Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 - k. ASTM D 4414 Standard Practice for Measurement of Wet Film Thickness (WFT) by Notch Gages;
 - l. ASTM D 5064 Practice for Conducting a Patch Test to Assess Coating Compatibility;
 - m. ASTM D 3276 Standard Guide for Painting Inspectors (Metal Substrates);

- n. ASTM D 3359 Adhesion by Tape Test
- o. ASTM D 4261 Surface Cleaning Concrete Unit Masonry for Coating;
- p. ASTM D 4414 Standard Practice for Measurement of Wet Film Thickness (WFT) by Notch Gages;
- 2. Society for Protective Coatings (SSPC)
 - a. SSPC-PA 1 Shop, Field, and Maintenance Painting of Steel;
 - b. SSPC-PA 2 Measurement of Dry Coating Thickness with Magnetic Gauges;
 - c. SSPC-SP 2 Hand Tool Cleaning;
 - d. SSPC-SP 3 Power Tool Cleaning;
 - e. SSPC Guide 6 Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations;
- 3. High Performance Building Reference Standards:
 - a. CAL (VOC) - Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers (including Addendum 2004-01); State of California Department of Health Services.
 - b. Refer to Specification Section 01616 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 DEFINITIONS

- A. Terminology as defined in the following standards apply to this section:
 - 1. ASTM D 16 Paint, Related Coatings, Materials, and Applications;
 - 2. ASTM E 284 Appearance;
 - 3. ASTM C 11 Standard Terminology Relating to Gypsum and Related Building Materials and Systems;
 - 4. National Paint & Coatings Association (NPCA) Glossary of Terms as listed at the following URL: www.paint.org/ind_info/terms.cfm;
 - 5. Paint/Coatings Dictionary, © 1978 by Federation of Societies for Coatings Technology.
- B. Design Standard: The paint/coating material specifically referenced by manufacturer's name/number, which determines the performance and quality requirements for materials referred in this Section.
- C. Low VOC Alternative: Where a primer or paint is scheduled for use on the interior of the building a product that meets (does not exceed) the VOC content limits established in the Project Manual shall be used. The supplier shall review all primers and paints submitted and provide appropriate alternative, comparable submittal to ensure that all primers (anti-corrosive, anti-rust, and otherwise), paints, varnishes, stains, shellacs, and coatings meet the criteria established in the Project Manual for Volatile Organic Compounds (VOCs), see Section 01616 - Volatile Organic Compound (VOC) Content Restrictions.
 - 1. Interior of the building is inside the weatherproofing system(s).

1.4 SUBMITTALS

- A. Complete and submit the Paint Material Cross Reference List for all paint/coating materials submitted (excluding the Design Standard).
- B. Complete and submit the Label Analysis Form for all paint/coating materials submitted (excluding the Design Standard).
- C. Waste Collection, Handling, Disposal Plan.
- D. Manufacturer's Information: Manufacturer's technical information including instructions for handling, storing, surface preparation application, warranty etc.
- E. Samples for Initial Selection: For each type of finish-coat material indicated provide a full color palette. After color selection, Architect will furnish a schedule indicating surfaces for each color selected.
- F. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.
 - 1. Architect will select one room or surface to represent surfaces and conditions for application of each type of coating and substrate.
 - a. Wall Surfaces: Provide samples on at least one wall.
 - b. Small Areas and Items: Architect will designate items or areas required.
 - 2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
 - a. After finishes are accepted, Architect will use the room or surface to evaluate coating systems of a similar nature.
 - b. Final approval of colors will be from benchmark samples.
- G. Errors, Omissions, and Other Discrepancies
 - 1. Submit all errors, omissions, and other discrepancies in contract documents to the Architect within 30 days of contract award for all work covered in this Section, other than the work that will not be uncovered until a later date. All such discrepancies shall be addressed and resolved, and the work plan modified, prior to beginning the initial and follow-up phases of work. Discrepancies that become apparent only after work is uncovered shall be identified at the earliest discoverable time and submitted for resolution.

1.5 QUALITY CONTROL

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. The Contractor should provide evidence to the Owner, with the bid submittal, that the Contractor, performing these coating operations is currently certified SSPC QP-1 by SSPC, The Society for Protective Coatings. Such certification is to remain in effect through the life of the contract.
- C. The Contractor shall designate a specific individual as the Paint/Coating Quality Control Supervisor (QCS). The QCS shall perform testing to ensure conformance to all requirements outlined in this section.
 - 1. QCS or designated personnel performing Quality Control (QC) testing during steel surface preparation and painting shall be NACE Level 1 Certified.
- D. During steel surface preparation and painting, Daily Inspection Reports shall be prepared in accordance with ASTM D 3276.

1.6 WARRANTY

- A. Manufacturer shall provide a minimum 5 year material and labor warranty covering defective materials for all finish systems. If a specific finish system has a standard warranty greater than the 5 year warranty indicated the greater warranty shall apply.
- B. Installer Warranty: two years from date of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
 - 1. Product name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
 - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.8 PROJECT CONDITIONS

- A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.
- B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.
- C. Do not apply paint in rain, fog, or to damp or wet surfaces.
- D. Do not apply when the air or surface is excessively hot resulting in "mud cracking." If mud cracking occurs an additional coat will be required. Mud cracking is not considered an acceptable condition.
- E. Do not apply paint when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The Design Standard paint/coating materials for this Section is The Sherwin Williams Company (SW). Subject to compliance with product submittal/approval requirements, provide one of the products listed in this Section or an equivalent product, as determined by the Architect. Other manufacturers will be considered contingent upon their responsiveness to the requirements set forth in Section

2.2 MATERIALS (GENERAL)

- A. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
- B. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- C. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.
- D. Colors: As selected by Architect from manufacturer's full range.
 - 1. Number of colors (of pigmented coating) selected by the Architect shall be limited to the following:

- a. Exterior finishes: 4 for Cement Plaster and Concrete Masonry
- b. Exterior hollow metal frames and doors: 2 per Campus.
- c. Colors for interior: 2
- 2. Approval of the in-place color against approved color chips shall be solely the right and judgment of the Architect.
- 3. Each underlying coat shall be tinted lighter than next coat or finish coat. The contrast shall be visible at a distance not less than 10 feet. The degree of contrast can be modified at the discretion of the Architect or appointed designee.

2.3 PRIMERS

- A. Interior Gypsum Wall Board (GWB) with textured and smooth finish (water-based finishes):
 - 1. SW PrepRite 200 Latex Wall Primer B28W200 Series

2.4 FINISH COATS

- A. Interior Alkyd Semi-gloss Enamel:
 - 1. SW ProMar 200 Interior Alkyd Semi-Gloss B34W200.
- B. Interior Semi-Gloss
 - 1. SW ProMar 200 Interior Latex Semi-Gloss B31W2200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.
 - 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 - 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 TECHNICAL REPRESENTATION BY PAINT MANUFACTURER

- A. A qualified technical representative of the paint manufacturers shall periodically visit the site to verify that the quality of surface preparation and painting conform to their requirements. Visits are required at the start of the project and a minimum of two visits during each of the following phases:
 - 1. Mockup review;
 - 2. Surface preparation;
 - 3. Primer application; and,
 - 4. Finish coat application.
- B. The manufacturer's representative shall summarize the results of the inspections in writing and provide recommendations if necessary. The Contractor shall provide copies of the manufacturer's reports to the Owner within seven days after each site visits.
- C. The Contractor shall comply with all manufacturers recommendations presented within the report at no additional cost to the Owner.

3.3 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning:
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
 - 2. Solvent Cleaning: Solvent Cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Allow adequate ventilation. Refer to Steel Structures Paint Council Surface Preparation Specification No.1 (SSPC-SP1).

3. Water Blasting NACE Standard RP-01-72: Removal of oil, grease, dirt, loose rust, loose mill scale, and loose paint by water pressures of 2,000 to 2,5000 psi at a flow of 4 to 14 gallons per minute.
 4. Hand Tool Cleaning: Hand tool cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Mill scale, rust, and paint are considered adherent if they can not be removed by lifting with a dull putty knife. Before hand tool cleaning, remove visible oil, grease, soluble residues, and salts by the methods outlined in SSPC-SP1. For complete instructions refer to Steel Structures Paint Council Surface Preparation Specification No.2.
- C. Surface Preparation:
1. Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings in accordance with manufacturer's written instructions for each particular substrate condition and as specified.
 2. Provide barrier coats over incompatible primers or remove and reprime. Typical incompatibility involves epoxy primers that have cured beyond their maximum recoat time.
 3. If dirt splash along base of a cleaned surface occurs, removal shall be performed via pressure cleaning or scrub brush and water. Dry broom removal is not an acceptable method of cleaning.
 4. Previously Coated Surfaces: Maintenance painting will frequently not permit or require the removal of all old coatings prior to repainting. However, all surface contamination such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mold, mildew, mortar, efflorescence, and sealers must be removed to assure sound bonding to the tightly adhering old paint. Glossy surfaces of old paint films must be clean and dull before repainting. Thorough washing with an abrasive cleanser will clean and dull in one operation, or wash thoroughly and dull by sanding. Spot prime any bare areas with an appropriate primer. Check for compatibility by applying a test patch of the recommended coating system, covering at least 2 to 3 square feet. Allow to dry one week before testing adhesion per ASTM D3359. If the coating system is incompatible, complete removal is required.
- D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.
- ### 3.4 APPLICATION
- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas to maintain system integrity and provide desired protection.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
 - 1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 - 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 - 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- F. Mechanical items to be painted include, but are not limited to, the following:
 - 1. Uninsulated metal piping.
 - 2. Pipe hangers and supports.
 - 3. Tanks that do not have factory-applied final finishes.
 - 4. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - 5. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
 - 6. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
- G. Electrical items to be painted include, but are not limited to, the following:
 - 1. Switchgear.
 - 2. Panelboards.
 - 3. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- H. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- I. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.5 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:
 - 1. Construction Manager will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Subcontractor.
 - 2. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.6 INTERIOR PAINT SCHEDULE

- A. Gypsum Wallboard:
 - 1. Primer: SW PrepRite 200 Interior Latex Primer B28W200; apply at WFT range of 4.0 - 5.0 mils to achieve DFT range of 1.5 - 2.0 mils.
 - 2. Intermediate Coat: SW ProMar 200 Interior Latex Semi-Gloss B31W2200; apply at WFT range of 4.0 - 5.0 mils to achieve DFT range of 1.5 - 2.0 mils. Tint 50-percent of finish coat to create definable contrast.
 - 3. Finish Coat: SW ProMar 200 Interior Latex Semi-Gloss B31W2200; apply at WFT range of 4.0 - 5.0 mils to achieve DFT range of 1.5 - 2.0 mils.

3.7 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.8 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

PAINT MATERIAL CROSS REFERENCE LIST

PROVIDE A LABEL ANALYSIS AS SHOWN IN THE EXAMPLE BELOW. THIS LIST IS REQUIRED AS PART OF THE SUBMITTALS.

SPEC SECTION	GENERIC DESCRIPTION	PRODUCT NAME	PRODUCT NO.	SUBSTRATE(S)	LOCATION(S)
2.4,H, 1 (E.G.)	WATER BASED EPOXY (E.G.)	HI-BILD WATER- BASED CATALYZED EPOXY (E.G.)	B71- V100 (E.G.)	DRYWALL (FINISH), CMU, CAST-IN-PLACE (C.I.P) CONCRETE (E.G.)	BATHROOM INTERIOR WALLS (E.G.)

CONTINUE ROWS AS REQUIRED BY THE SUBMITTAL.

LABEL ANALYSIS FORM

PROVIDE A LABEL ANALYSIS AS SHOWN IN THE EXAMPLE BELOW. THIS LIST IS REQUIRED AS PART OF THE SUBMITTALS WHEN THE DESIGN STANDARD IS NOT PROVIDED. PROVIDE THE FOLLOWING DATA:

PRODUCT NAME:	PRODUCT NUMBER:	MANUFACTURER:

COMPOSITION BY WEIGHT:

WEIGHT PER GALLON:	LBS.	P.V.C.	%
SOLIDS BY WEIGHT:	%	SOLIDS BY VOLUME:	%
TOTAL PIGMENT:	%	TOTAL VEHICLE:	%

LIST COMPONENTS COMPRISING PIGMENT. QUANTIFY COMPONENTS NO PROVIDED (I.E. EXTENDER PIGMENTS, ANTI-CORROSIVES, ETC.).	LIST COMPONENTS COMPRISING VEHICLE. QUANTIFY COMPONENTS NO PROVIDED (I.E. ADDITIVES, FUNGICIDE, BIOCIDES, ETC.).
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TITANIUM OXIDE (TiO2)	%	ACRYLIC RESIN (SOLIDS)	%
ZINC OXIDE	%	ALKYD RESINS (SOLIDS)	%
CALCIUM CARBONATE	%	VINYL/ACRYLIC CO-POLYMER	%
SILICATES	%	POLYVINYL ACETATE (P.V.A.)	%
MISCELLANEOUS FELDSPARS	%	ETHYLENE GLYCOL	%
	%	VOLATILE (WATER)	%
	%	VOLATILE (SOLVENT)	%
	%		%
	%		%
TOTAL	100 %	TOTAL	100 %

VOLATILE ORGANIC COMPOUND (V.O.C.) AS SUPPLIED ?	LBS/GAL	G/L
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FINISH OR TOP COAT PRODUCTS

WHAT IS THE 60 DEGREE ANGULAR SHEEN (SATIN OR HIGHER)	UNITS
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WHAT IS THE 85 DEGREE ANGULAR SHEEN (FLAT OR MATTE FINISHES)	UNITS
IS THE PRODUCT OFF-CASTED (PIGMENTS ADDED TO INCREASE HIDING POWER)?	
IF COLORS ARE FACTORY ADDED, WHAT PIGMENT IS USED?	

END OF SECTION

SECTION 11 6100 - LABORATORY FUME HOODS UNIFLOW SE AIRESTREAM SERIES**PART 1 GENERAL****SUMMARY****2.1 SECTION INCLUDES:****A. Laboratory Fume Hoods**

1. Reference Standards:
 - a. UL 1805 - Standard for Laboratory Fume Hoods and Cabinets
 - b. UL 3101 - Electrical Equipment for Laboratory use
 - c. ASHRAE 110-1995 - Method of Testing the Performance of Laboratory Fume Hoods
 - d. SEFA 1-2003 - Recommended Practices for Laboratory Fume Hoods
 - e. NFPA-45 - Standard on Fire Protection for Laboratories
 - f. ANSI/AIHA Z9.5-2012 - Standard on Ventilation for Laboratories
 - g. OSHA 29-CFR-1910 - Occupational Safety and Health Standards
 - h. CAL/OSHA 5154.1 - Ventilation Requirements for Laboratory-Type Hood Operations
 - i. ASTM E-84 - Method of testing Surface Burning Characteristics of Building Materials
 - j. CSA-22.2 - Canadian Standard for Wire/Cable Requirements and use
 - k. ISO 9001-2008 - Certified Company
2. "Made in USA" - Laboratory Fume Hoods manufactured and assembled entirely in the USA, ISO 9001-2008 Certified Company.

B. GENERAL FUME HOOD DESIGN REQUIREMENTS

1. All fume hoods covered in this section are of the UniFlow SE AireStream Series with unitized dual wall composite construction. Molded aerodynamic face opening with upper and lower airfoils to minimize air flow turbulence and provide a constant volume of air flow thru the VaraFlow Baffle System to the integral bell shaped exhaust collar of the fume hood. The white component fume chamber is one piece molded with all coved corners and a glass smooth finish for ease of cleaning.
2. Variable Air Volume (VAV) Mold: This design has a restricted bypass. With a design face velocity set, the air volume changes as the sash is raised or lowered. A minimum flow of 25 CFM per Ft² of surface is recommended by the NFPA when the sash is closed
3. Superstructure and Mold Liner Material: The UniFlow Laboratory Fume Hood Superstructure is unitized composite construction for total chemical resistance, strength, durability and reduced weight. Construction material are white thermosetting HiPel® resin surface layers with HiPel® fiberglass reinforced composite core. Construction materials are tested and classified by U.L. for Class A fire resistant, non-metallic materials used in laboratories. (ref. NFPA45)
4. VaraFlow Baffle System: Fume hood shall effectively maintain safe, constant exhaust volume at any baffle position. VaraFlow baffles will be constructed of upper, middle, and lower sections. Panels will be positioned such that horizontal and vertical edge slots effectively create near laminar air flow through the fume chamber. Baffles are factory set such that the fume hood is at its optimum performance level. Panels are constructed of HiPel® composite resin.
5. Air Foil: Molded of HiPel® composite resin (no sharp edge or pinch joints). Color finish shall be glass smooth (no paint on finish). Air foil across lower sash to provide clean sweep of air over work surface. One inch air bypass inlet under air foil to insure uniform air flow at face and to sweep heavier than air vapors off work surface.
6. Removable Front Panel: Located above the sash allows access to the electrical connections, light bulb change out, sash weights and duct connections.
7. Sash: Picture frame sash is constructed of clear tempered safety glass. Frame, track and pull fabricated of chemical resistant PVC. Counterbalance system constructed of continuous pvc coated, stainless steel aircraft cable with attached single sash counter weight for ease of movement. (Also available is laminated safety glass or polycarbonate sash option).
8. Illumination of work area: Minimum average of illumination in the fume hood chamber should be at least 80 foot candles. Work space shall be defined as the area inside the superstructure from side to side and from face of baffle to the inside face of the sash, and from the working surface to a height of 52 inches to the ceiling of the fume chamber.
9. Sash Management: Fume hoods shall be designed for operator safety. Air flow must remain consistent and safe through the face of the hood. Integrated with factory installed sash stop to keep sash at the half open position during operation. Proper sash management recommends that the sash never be in operation when fully open. As defined in this section, negative variations of the face velocity shall not surpass 20% of the average face velocity at any designated measuring position. Fume hood shall be designed to minimize static pressure loss using a bell shaped exhaust collar molded of non-metallic

composite glass reinforced resin. Exhaust collar to be integrally molded into fume chamber ceiling, not screwed. Maximum average static pressure loss readings shall not exceed .40 inches S.P.L. (W.G.) at a face velocity of 100 F.P.M. (sash at half open position)

10. Passive Auto Sash (optional): Automatic, non-motorized system. When raised to full open position, the passive sash mechanism returns the sash to half open.

C. SUBMITTAL INFORMATION

1. Submit manufacturer's test data and installation instructions for each type of fume hood. Provide data indicating compliance with UL 1805, ASHRAE 110-95 Standards and ISO 9001-2008.
2. Provide samples of the following:
 - a. Color samples of manufacturer's finish.
3. Submittal drawings for proposed fume hoods shall include plans, elevations, sections and service run spaces. Detailed specifications must include notation of all specified items.
 - a. Service fittings, as related to the fume hood, shall illustrate location and type when required.
 - b. Mechanical and electrical services, as related to the fume hood, shall be illustrated where required.
 - c. Face opening, air volume and static pressure data of each fume hood shall be clearly noted in drawings or separate documentation.

PART 2 PRODUCTS

MANUFACTURER

- 4.1 "MADE IN USA" - FUME HOODS AND ASSOCIATED EQUIPMENT ENTIRELY MANUFACTURED AND ASSEMBLED IN THE USA BY: HEMCO CORPORATION, 711 SOUTH POWELL ROAD, INDEPENDENCE, MISSOURI, 64054. ISO 9001-2008 AND UL 1805 CERTIFIED AND CSA LISTED.

A. MATERIALS

1. HiPel® composite construction of fume hoods :
 - a. Molded: reinforced HiPel® (Two (2) white surfaces chemically bonded to a fiberglass reinforced core layer of Hipel® thermosetting resin. No exposed fiberglass. Nominal thickness of 4.5mm). Hipel® meets or exceeds the NFPA 45 Fire Protection for Laboratories using Chemicals. (UL 1805 Classified)
2. Typical thickness:
 - a. 3/16"-1/4" thick HiPel® composite resin. Double wall shall provide base for remote service fixture outlets, electrical boxes and other service that may be required.
3. Sash glass:
 - a. 1/4" Laminated Safety Glass per ASTM C 1172
4. Sash: Frame, track and lift constructed of chemical resistant polyvinyl chloride (PVC).
5. Fastening devices:
 - a. Interior surfaces: PVC-capped #8 pan stainless screws, nylon bolts
 - b. Exterior structural members: #8 pan stainless steel screws, nylon bolts
6. Fume Chamber: One piece liner consists of all interior surfaces, sides, top, and back.
 - a. Standard: Molded non-conducting HiPel® resin, nominal thickness of 3/16", white

B. CONSTRUCTION

1. Unitized Superstructure: Consists of 3/16" thick, non-conducting, dual wall HiPel® composite resin side walls, 5" side wall width. Exterior side walls are chemically bonded to a molded liner so that the complete structure is unitized construction. Any framing not consisting of a complete fiberglass structure is unacceptable. Front and both sides of the superstructure are aligned for precision fit.
2. Airfoils:
 - a. Lower airfoil: Molded of non-conducting HiPel® composite resin. Airfoil across lower sash to provide clean sweep of air over work surface. One inch air bypass inlet under air foil to ensure uniform air flow at the face of the fume hood. Sweeps heavier than air vapors off work surface.
 - b. Upper Airfoil: Molded of non-conducting HiPel® composite resin, that provides clean flow of air in upper area of the fume chamber to minimize turbulent air flow through the fume chamber.
 - c. chamber.
3. Sash Assembly:
 - a. Full view vertical raising clear tempered safety glass framed in solid white PVC framing. The sash shall have full width finger sash pull; to have "trailing edge" to prevent back flow of fumes to escape fume chamber. The sash shall be counter balanced at a single point to eliminate racking of the sash. Sash shall require no more than a 5 pound force to lift. 1/8" diameter stainless steel aircraft cable connects the sash to the epoxy coated counterweight. Cable to have PVC coating to prevent corrosion. The cable rides on a 2" diameter nylon ball bearing pulley system. Sash cable to run through the bottom of the sash to prevent sash from dropping. Equipped with an adjustable counterweight for tilting adjustment. Pulley bearings stainless steel. Painted steel parts in the sash are not acceptable.

4. VaraFlow Baffles: The fume hood superstructure shall have an internal baffle system of the same HiPel® composite material as the hood structure. Lower baffle shall consist of a staggered slotted array for near laminar air flow through fume chamber. The baffle system shall provide for safe efficient removal of fumes through the fume chamber. Baffles to have rounded entry edges to draw fumes smooth through baffle system. Baffles are removable for cleaning. Constructed of non- conducting, HiPel® composite resin.
5. Extended View Panel: System consisting of a 3/16" thick clear tempered safety glass panel allowing full extended visual display of fume hood interior.
- C. Duct collars: Standard 12" round exhaust outlet collar(s), bell entry from fume chamber to efficiently draw fumes into exhaust duct. The outlet to be constructed of the same material as the hood structure (HiPel® composite resin) and chemically bonded to the fume chamber ceiling. Metal screws, bolts or welds are not acceptable for attaching.
- D. Fascia posts: Aerodynamically angled to provide uniform air flow into the fume chamber. Shall be a continuation of the one piece homogeneous liner. Molded of non-conducting HiPel® composite resin.
- E. Exterior Side Panels: Molded of non-conducting HiPel® composite resin. Unitized and chemically bonded to form homogeneous one piece superstructure. Painted steel end panels not acceptable.
- F. Clearance (interior): All SE AireStream hoods are designed to have a nominal interior vertical clearance of 52" in the front twelve inches of the hood depth. Dimensions of the interior may be affected by additional services or options.
- G. Lighting: Fluorescent light fixtures consist of 2 tube T-5's in the following standard configurations: 60" hood (1-36" fixture)
 1. Explosion-proof fixture (with screw in sockets). (UL/CSA listed)
- H. Service Fittings and Fixtures:
 1. Service fittings and fixtures shall be manufactured by the Water Saver Fixture Company or equal equivalent. Fixtures and handles shall indicate the proper service using color coding. The color codes are as follows:

a. Service	Color	
b. Carbon Dioxide (CO2)		Pink
c. Gas (GAS)		Blue
d. Distilled Water (DW)		White
e. Air (AIR)		Orange
f. Hydrogen (HYD)		Pink
g. Vacuum (VAC)		Yellow
h. Nitrogen (NIT)		Brown
i. Steam (STM)		Black
j. Oxygen (OXY)		Lt. Green
k. Cold Water (CW)		Green
l. Hot Water (HW)		Red
m. Deionized Water (DI)		White
n. Other Services		Available upon request
 2. Finish of Service Fixtures:
 - a. Laboratory service fixtures (with the exception of fittings inside the fume hood) shall have a colored polished nylon handle with a full-view screw-on colored index button.
 - b. Service fittings inside the hood shall have an epoxy finish color that is coded to match the fixture service index color.
 3. Electrical services:
 - a. All electrical receptacles, duplexes, and switches are prewired to a single junction box for electrical connection (with the exception of explosion proof models). All electrical receptacles are 3-wire, 15 or 20 amp duplex, 115 or 230 VAC, or as specified. Light switch shall be 3-wire polarized grounded, 15 amp, 125VAC or as specified. Face plates are nylon. Electrical components are UL/CSA listed.
 4. Work surfaces (Option - choose one):
 - a. Epoxy resin, 1-1/4" thick, molded to contain chemical spillage, dished section not less than 1/4" thick. Black
 5. Instruction Plate: Corrosion resistant or plastic plate attached to the fume hood exterior with condensed information covering recommended locations for apparatus and accessories, use of sash and recommended safe operating procedures.
- I. ISO Quality Control Standards
 1. Laboratory fume hoods provided will be the product of a single manufacturer. Each fume hood will be based on the specifications of the SE Airestream series as described in section 2.02. Any manufacturer other than those specified shall provide proof of capability in the manufacturing of fume hoods and be prepared to have their manufacturing facility examined per customer request.

2. Any manufacturer desiring authorization for this project must maintain a fume hood examination test lab at their plant location. The test lab must provide make-up air and variable exhaust control. Floor-to-ceiling wall diffusers are unacceptable. All eligible test labs must have the ability to conduct ANSI/ASHRAE 110-1995 testing per customer request. All data readings shall be submitted in disc format.
 - a. "Made in USA" - Laboratory Fume Hoods manufactured and assembled entirely in the USA and is an ISO 9001-2008 Certified Company.
 3. The manufacturer shall, for a period of five (5) years from date of shipment, Warrants that the fume hood shall be free from defects in material and workmanship. The manufacturer shall repair or replace any portion of the fume hood, under normal use, if examination discloses it to have been defective within the warranty period. Warranty to be submitted at time of submittal.
 4. UL 1805 Certified: Fume hoods must be UL 1805 classified. This standard covers mechanical risks, examines the flammability of materials and measures the efficiency of airflow characteristics, electrical has been tested to UL 3101 with consistent operation. All fume hoods must bear the proper UL labeling and must be attached to the face of each fume hood indicating its classification to UL 1805. Must be green product certified and manufactured by an ISO 9001: 2008 Certified Company.
- J. Fume Hood Options: See the attached owner provided design sheet with additional owner requested options.
- K. Fume Hood Base to be comprised of two Hemco Acid Storage Cabinets model number #53011. Finish and Color to be selected by Owner.

PART 3 EXECUTION

5.1 INSTALLATION - REFER TO OPERATION AND MAINTENANCE MANUAL

- A. Fume hoods and equipment shall be installed in accordance with manufacturer's instructions.
 1. Work surfaces shall be properly secured to casework using proper instructions recommended by the manufacturer.
 2. Accessory installation: All accessories and fittings shall be properly installed in accordance with manufacturer's recommendations.
- B. PROTECTION OF FINISHED WORK
 1. Take protective action to prevent exposure of casework and equipment from exposure to other construction activity.
 2. Recommend contractor of proper procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.
- C. DELIVERY, STORAGE AND HANDLING
 1. Protect all finished surfaces from damage during handling and installation.
 2. Protect all work surfaces throughout construction period whenever possible.
 3. Upon receiving, inspect for crate damage and possible concealed damage that may have occurred in transit. Save all delivery receipts and crating materials. If damaged call the adjuster for the delivering carrier promptly and notify manufacturer.

SECTION 12 3553.19 - WOOD LABORATORY CASEWORK

PART 1 GENERAL

- 1.1 SECTION INCLUDES
 - A. Wood cabinets and cabinet hardware.
 - B. Vacuum pump cabinets.
 - C. Countertops.
 - D. Service fittings and outlets.
- 1.2 RELATED REQUIREMENTS
 - A. Section 01 6000 - Product Requirements: Requirements for sustainably harvested wood.
 - B. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: VOC limitations for adhesives and sealants.
 - C. Section 07 9200 - Joint Sealants: Sealing joints between casework and countertops and adjacent walls, floors, and ceilings.
- 1.3 DEFINITIONS
 - A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches above finished floor, tops of cases less than 72 inches above finished floor and all members visible in open cases or behind glass doors.
 - B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches above finished floor and bottoms of cabinets more than 30 inches but less than 42 inches above finished floor.
 - C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches above finished floor.
- 1.4 REFERENCE STANDARDS
 - A. ANSI A135.4 - American National Standard for Basic Hardboard.
 - B. ANSI A208.1-1999 - Particle Board Plywood.
 - C. ANSI A 208.2-1994 - MDF Plywood.
 - D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.
 - F. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.
 - G. NFPA 30 - Flammable and Combustible Liquids Code.
 - H. SEFA 2.3 - Installation of Scientific Laboratory Furniture and Equipment.
 - I. SEFA 3 - Scientific Equipment and Furniture Association.
 - J. SEFA 8 - Scientific Equipment and Furniture Association.
 - K. SEFA 3 - Work Surfaces.
 - L. SEFA 7 - Laboratory and Hospital Fixtures.
 - M. SEFA 8W - Laboratory Grade Wood Casework.
- 1.5 ADMINISTRATIVE REQUIREMENTS
 - A. Large Components: Ensure that large components can be moved into final position without damage to other construction.
- 1.6 SUBMITTALS
 - A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
 - B. Product Data: Component dimensions, configurations, construction details, joint details, attachments; manufacturer's catalog literature on hardware, accessories, and service fittings, if any.
 - C. Shop Drawings: Casework locations, large scale plans, elevations, cross sections, rough-in and anchor placement dimensions and tolerances, clearances required, and utility locations, if any.
 - D. Samples For Color Selection: Wood samples, fully finished, for color and species selection.
 - E. Test Reports: From independent laboratory indicating compliance with referenced chemical-resistance standards for cabinet finish and liner materials.
 - F. Manufacturer's Installation Instructions.
 - G. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- 1.7 QUALITY ASSURANCE
 - A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Wood Laboratory Casework:
1. Kewaunee Scientific Corp: www.kewaunee.com. or equal.

2.2 WOOD LABORATORY CASEWORK

- A. Wood Laboratory Casework: Solid wood and wood panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels.
1. Style: Kewaunee Scientific Corporation, SIGNATURE SERIES - CONTEMPORARY FULL OVERLAY - STYLE 5 Laboratory Furniture or equal..
 2. Construction: Provide joints doweled, glued and screwed, except drawers may be lock shoulder jointed; with interior of units smooth and flush; cabinet bottom flush with top of face frame; without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.
 3. Structural Performance: In addition to the requirements of SEFA 3, SEFA 7, and SEFA 8W, components safely support the following minimum loads:
 4. Scribes and Fillers: Where cabinets do not fit tight to adjacent construction, provide filler panels of matching construction and finish.
 5. Finish: Factory-finish all exposed and semi-exposed surfaces with the same finish.
 - a. Finish Performance: Provide finish on all surfaces having chemical resistance of Level 0 (no change) or Level 1 (slight change of gloss or slight discoloration) according to SEFA 8W and no visible effect when surface is exposed to:
 - 1) Hot water at temperature between 190 degrees F and 205 degrees F trickled down the test surface at 45 degree angle for 5 minutes.
 - 2) Constant moisture in the form of 2 by 3 by 1 inch thick cellulose sponge kept continually saturated with water and in contact with test surface for 100 hours.
 - b. Preparation: Wood sanded smooth, free from dust and mill marks.
 - c. Stain: Single application of clean, manufacturer-recommended stain of selected color; tinted coating not acceptable.
 - d. Coating: Clear, superior-quality, chemical-resistant acyclic urethane; applied in accordance with manufacturer instructions, force-dried, sanded and wiped clean.
 - e. Coats: Multiple coats as required to achieve minimum 1.5 mil dry film thickness.
 - f. Appearance: Clear satin gloss; not cloudy or muddy.
- B. Vacuum Pump Cabinets: Construction identical to other cabinets, with following exceptions:
1. No cabinet bottom but with integral toe space, removable back panels and precut 2-1/2 inch vent hole for separate vent assembly.
 2. Insulation: Manufacturer's standard acoustical insulation on interior of door panels, interior side of back and panels as well as underside of top panel.
 3. Motor Platform: Separate from cabinet, capable of supporting 300 lbs, two of four casters to be lockable, swivel-type; 2 inch lip and liquid-tight pan covering entire bottom of cabinet.
 4. Pump On/Off Switch: Integral, 120V, 20A, with pilot light indicating availability of power and mode of vacuum pump operation.
 - a. Conduit Stub: 20 foot long, 1/2 inch diameter, flexible metal conduit connected to switch, for connection to building power.
 5. Convenience Outlet: Integral electrical duplex outlet located in the rear of the cabinet, accessible from inside the cabinet and pre-wired to pump on/off switch.
- C. Epoxy Resin Countertops: Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
1. Manufacturer: Duratop Epoxy Resin Countertops or equal by casework manufacturer.
 2. Flat Surface Thickness: 1 inch, nominal.
 3. Surface Finish: Smooth, non-glare, matte finish with clean exposed edges in uniform plane, free of defects.
 4. Color: Black.
 5. Exposed Edge Shape: 1/8 inch bevel chamfer.
 6. Indented Areas: Internal and external corners shall have 1/4" to 1/2" radius.
 7. Drip Edge: Drip groove 1/8 inch wide and deep, located 1/2 inch back from edge on underside of each exposed edge.
 8. Back and End Splashes: Same material, same thickness; separate for field attachment. See drawings for Utility pedestal.
 9. Sink Mounting: Drop-in sink cutout shall be profiled to provide support for the sink, and to ensure that the rim of the installed sink is 1/8 inch (3 mm) below the surrounding work surface level or bottom of

drain grooves, if present. The top edge of the cutout shall have 1/8 inch (3 mm) bevel. Fill any overcut with 2 part epoxy adhesive to ensure there will be no gaps between the installed sink rim and work surface. Coordinate cut out with Duratop Epoxy Lipped Drop-in Sink model: Kemresin 1005-DI-VK (Length 25" ID, Width 15-1/2" ID, Depth, 10" ID) or equal by casework manufacturer.

10. Provide all faucet & utility holes and cutouts as required for built in equipment and mechanical and electrical service fixtures. Verify size and location of opening with actual size of equipment to be used prior to making openings. Form inside corners to a radius of not less than 1/8 inch (3 mm). After drilling, rout and file cutouts to ensure smooth, crack free edges. Seal exposed edges after cutting with a waterproofing material recommended by the manufacturer.
11. Install epoxy resin countertops with supplier's recommended silicone or Epoxy resin adhesive to the casework.
12. All square butt joints, splashes and sealing around sinks to be manufacturer's recommended compatible and chemical resistant epoxy adhesive.

2.3 MATERIALS

- A. Material shall be selected so that the finished installation shall provide an attractive and harmonious appearance. All exterior casework surfaces exposed to view after installation, and cabinet interior surfaces, shall be Red Oak. Solid woods and veneers exposed to view after completion of installation shall be of color and graining in conformance with the normally accepted standards required of the scientific laboratory equipment industry.
- B. Solid Woods: All solid woods shall be carefully and thoroughly air-dried, then kiln dried in humidity controlled kilns to a moisture content of 4-1/2%. All kiln dried lumber shall then be tempered to a moisture content of 6% before use. This moisture content shall be maintained throughout production.
- C. Exposed Hardwood Plywood: HPVA HP-1 Grade AA, Type I; veneer core; same species as exposed solid wood, clear, compatible grain and color, no defects. Band exposed edges with solid wood of same species as veneer. Softwoods are not permitted.
 1. Veneer Core Plywood: Veneer core plywood shall be either 7-ply (3/4") or 9-ply (1") and shall be compliant with ANSI/HPVA HP-1 2004.
 2. Composition Core Plywood: Composition core plywood shall be 3-ply and shall be compliant with ANSI A208.1-1999, and/or ANSI A208.2-1994.
 3. Face Veneers: Plywood face veneers shall be Grade A, plain sliced, slip matched, Red Oak on face, and Grade 1, Red Oak on back.
- D. Banding: Plywood panels shall be edge banded as specified with 3mm hardwood edgebanding to match the plywood veneer.
- E. Hardboard: Hardboard shall be a wood fiber/resinous combination formed with heat and pressure into sheets providing a hard, smooth surface.
- F. G. Hardware and Trim:
 1. Drawer and Door Pulls: Drawer and door pulls shall be mounted on 4" centers, offering a comfortable hand grip, and be securely fastened to doors and drawers. They shall be manufactured from Anodized aluminum in a shallow rounded shape.
 2. Hinges: Hinges shall be the five (5) knuckle, satin finish stainless steel, institutional, offset type for all swinging doors. Hinges shall be 2-3/4" long, and secured to cabinet and doors with flathead screws, so applied to withstand a weight load of 150 lbs. minimum.
 3. Locks: Pin Tumbler: Locks when shown or called for shall be a pin tumbler with heavy duty interchangeable cylinder. Exposed lock noses shall be dull nickel (satin) plated and stamped with identifying numbers. Locks shall have capacity of at least 1000 primary key changes, and the capacity to be Masterkeyed, Grand-masterkeyed, Sub-masterkeyed, and Mason Keyed.
 4. Roller Catches: Roller Catches shall have a spring-loaded polyethylene roller and a steel strike plate.
 5. Elbow Catches: Elbow catches and strike plates shall be cast aluminum with bronze finish.
 6. Drawer Slides: Drawer slides shall be zinc plated, cold rolled steel, full extension, linear ball bearing slides rated at 100 pounds minimum. The drawer shall be removable without the use of tools.
 7. Shelf Support Clips; Shelf support clips shall be twin pin type for mounting on interior of cabinet end panels. Clips shall be corrosion resistant and shall retain shelves from accidental removal and tipping. Shelves shall be adjustable on 32mm centers. Surface mounted metal support strips and clips subject to corrosion are not acceptable.
- G. Service Fittings and Fixtures: See Plumbing drawings and specifications.

2.4 CONSTRUCTION

- A. General Requirements: It is the intent of this specification to provide a high quality wood cabinet specifically designed for the laboratory environment. The cabinet shall be full overlay construction with 3/4" thick door and drawer fronts. The door and drawer fronts shall occupy a plane extending 3/4" past the plane of the front of the cabinet body. Edges of door and drawer fronts shall be square. The doors and drawer fronts shall overlay the face of the cabinet leaving minimal reveals between doors and drawers of approximately 1/8". All

cabinet end panels shall be finished for the purpose of future relocation unless cabinet is selected with the "unfinished end" option. The exposed grain for doors and drawer fronts shall run vertical be matched to the door or drawer front above or below it.

B. Base Cabinets:

1. End Panels, Bottoms, and Shelves: All cabinet end panels shall be 3/4" thick Red Oak veneer core plywood edge banded on exposed edges. End panels shall be multiple doweled, glued, and screwed to top frame members, intermediate rails, and bottoms. Cupboard bottoms shall be 3/4" thick Red Oak veneer core plywood edge banded on exposed edge. All cupboard base cabinet shelves shall be full-width adjustable, 3/4" thick Red Oak veneer core plywood edge banded on exposed edge. Integrally joined parts shall result in a totally enclosed cabinet.
2. Backs: Cabinet backs shall be 1/4" thick hardboard, dadoed into end panels and securely fastened to cabinet bottom and top back rail. Backs that are attached to end panels with cleats shall be unacceptable.
3. Full Top Frame: The cabinet top frame shall consist of a front rail, a back rail and two side rails. The front rail shall be 3 1/8" x 1" hardwood with 3mm Red Oak facing. The back rail shall be 2-1/2" x 3/4" hardwood plywood. The side rails shall be 1-3/4" x 3/4" hardwood and shall be screwed to end panels and front and back rails.
4. Drawers: Drawer sides, back, and sub-front shall be 1/2" thick, 9-ply Birch plywood. Drawer heads shall be 3/4" thick, Red Oak, composite core plywood. A dovetail joint shall be used to attach the drawer sub-front and drawer back to the drawer sides. Drawer bottoms shall be 1/4" thick hardboard with a white melamine finish, set and hot-melt glued into 1/4" grooves, four sides. Each drawer shall have one pull mounted horizontally, drawers over 24" long shall have two pulls. Drawer sub-fronts attached to drawer sides with a lock-tenon joint shall be unacceptable.
5. Doors: a. Swinging doors shall be 3/4", Red Oak, composite core plywood edge banded on all four edges, mounted on cabinet with 1 pair of offset hinges and shall be latched with a roller catch. Double doors without locks shall have a roller catch on each door. Double doors with locks shall have an elbow catch mounted on the left-hand door and the lock and a roller catch mounted on the right-hand door. Each door shall have one pull mounted vertically.

C. Wall Cabinets:

1. Cabinet: All cabinet end panels shall be 3/4" thick Red Oak veneer core plywood edge banded on front and bottom edge. Tops and bottoms shall be 1" thick Red Oak veneer core plywood edge banded on exposed edge, multiple doweled into end panels, and secured with glue and countersunk screws. Shelves shall be 1" thick Red Oak veneer core plywood edge banded on exposed edge. Shelves shall be adjustable on 32mm centers utilizing shelf support clips. The backs in open and glazed door cases shall be 1/4" Red Oak composite or veneer core plywood while the back not exposed to view shall be 1/4" hardboard. Case interior shall be flush.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that service connections are correctly located and of proper characteristics.

3.2 INSTALLATION

- A. Coordination: Coordinate the work of the Section with the schedule and other requirements of other work being performed in the area at the same time both with regard to mechanical and electrical connections, and the general construction work.
- B. Performance:
 1. Casework:
 - a. Perform installation in accordance with manufacturer's instructions and with SEFA 2.3.
 - b. Set casework components plumb, square, and straight with no distortion and securely anchor to building structure. Shim as required using concealed shims.
 - c. Screw continuous cabinets together with joints flush, tight and uniform, and with alignment of adjacent units within 1/16" tolerance.
 - d. Secure wall cabinets to solid supporting material, not to plaster, lath or gypsum board. Use anchoring devices to suit conditions and substrate materials encountered.
 - e. Abut top edge surfaces in one true plane. Provide flush joints not to exceed 1/8" between top units.
 2. Worksurfaces:
 - a. Where required due to field conditions, scribe to abutting surfaces.
 - b. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure the joints in the field, where practical, in the same manner as in the factory.
 - c. Secure worksurfaces to casework and equipment components with materials and procedures recommended by the manufacturer.
- C. Use anchoring devices to suit conditions and substrate materials encountered.

- D. Align cabinets to adjoining components, install filler panels where necessary to close gaps.
- E. Vented Cabinets: Install in strict compliance with manufacturer's written installation instructions.
 - 1. Install vent kits and connect to fume hood exhaust system.
 - 2. Use only rigid materials for venting. No flexible materials permitted.
- F. Replace units that are damaged, including those that have damaged finishes.

3.3 ADJUSTING AND CLEANING

- A. Repair or remove and replace defective work, as directed by owner and/or his representative upon completion of installation.
- B. Adjust doors, drawers and other moving or operating parts to function smoothly.
- C. Clean shop finished casework; touch up as required.
- D. Clean worksurfaces and leave them free of all grease and streaks.
- E. 5. Casework to be left broom clean and orderly.

3.4 PROTECTION

- A. Provide reasonable protective measures to prevent casework and equipment from being exposed to other construction activity.
- B. Advise owner and/or his representative of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.

END OF SECTION